

RABIES--



(What Health Care Providers Need to Know)

Grand Rounds – Chesapeake General Hospital

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Chesapeake Health Department
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What is Rabies?

- Rabies is a dangerous disease caused by a virus.
- Around the world, rabies kills 50,000 people and millions of animals each year.



Infectious Agent



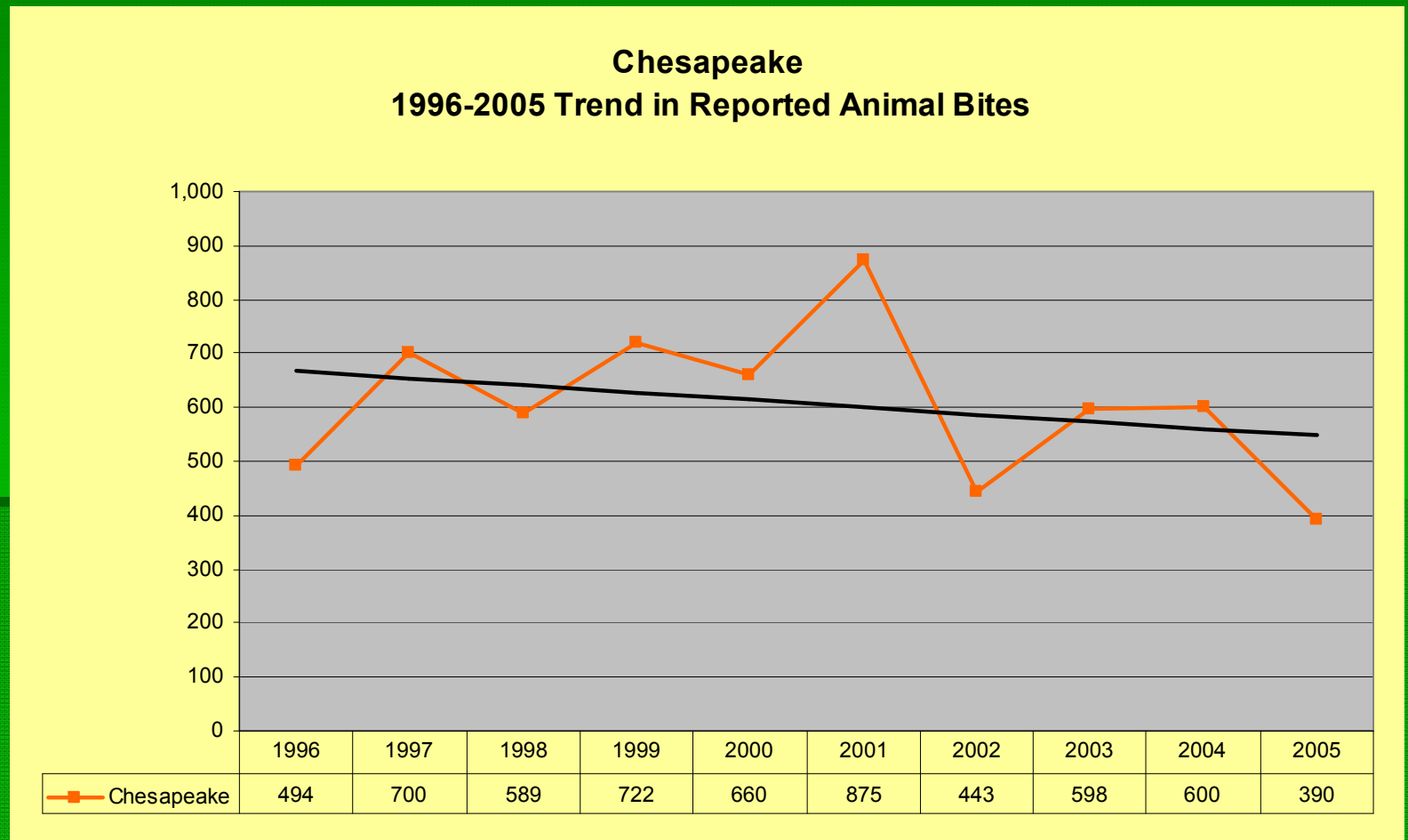
- **Rhabdovirus—causes encephalomyelitis in warm-blooded hosts which is invariably fatal.**
- **Sequencing of virus can differentiate animal species and geography of origination.**

Occurrence

- Common in Asia, Africa and Latin America where dogs are major reservoir.
- 1998—inmate in Richmond died from bat rabies (first case in VA since 1953).
- 2003—outdoors man in Northern VA died from rabies (first US case raccoon variant).

Occurrence

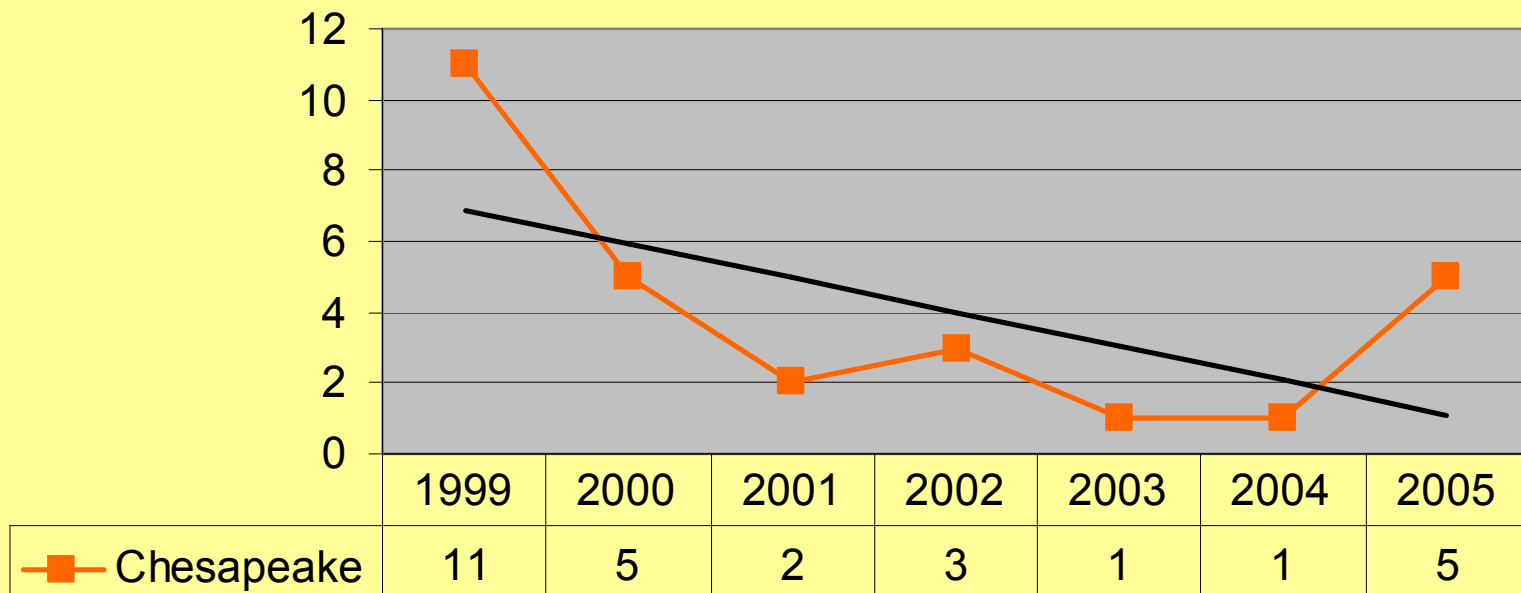
- Trend in bite investigations



Occurrence

- Trend in positive animals

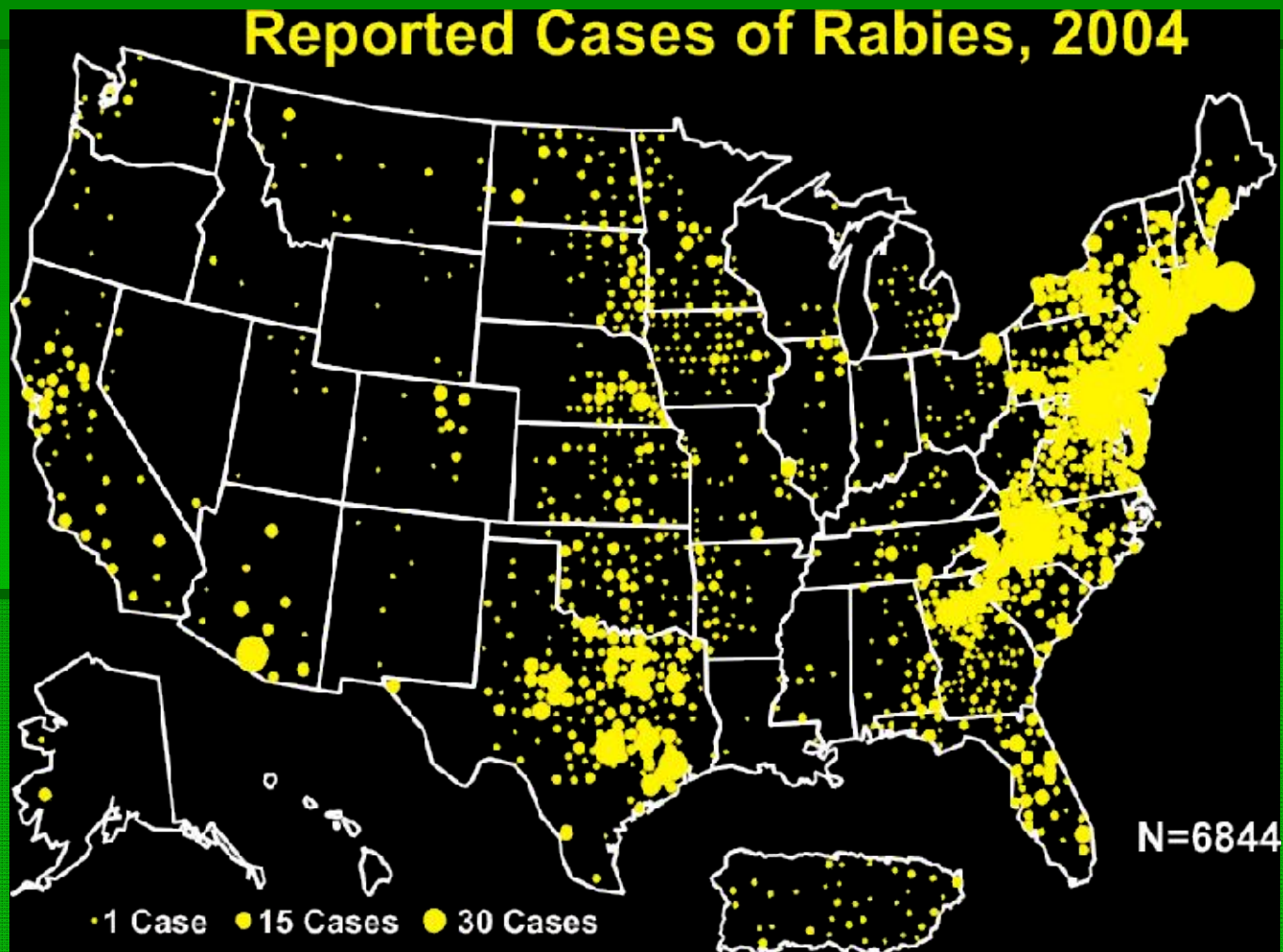
Chesapeake
Confirmed Animal Rabies Cases
1999-2005



Maps

(Source: CDC)

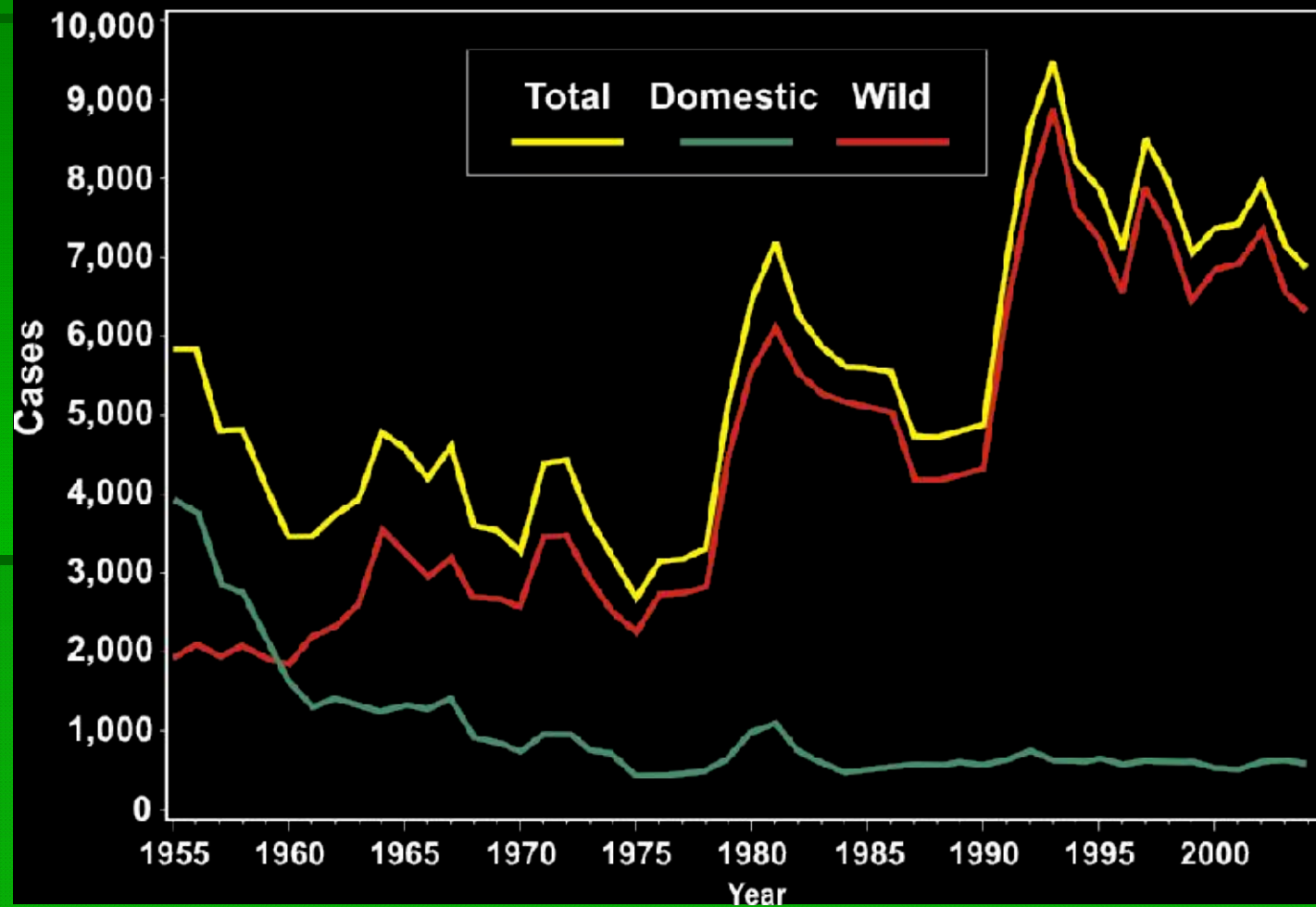
United States



Maps

United States

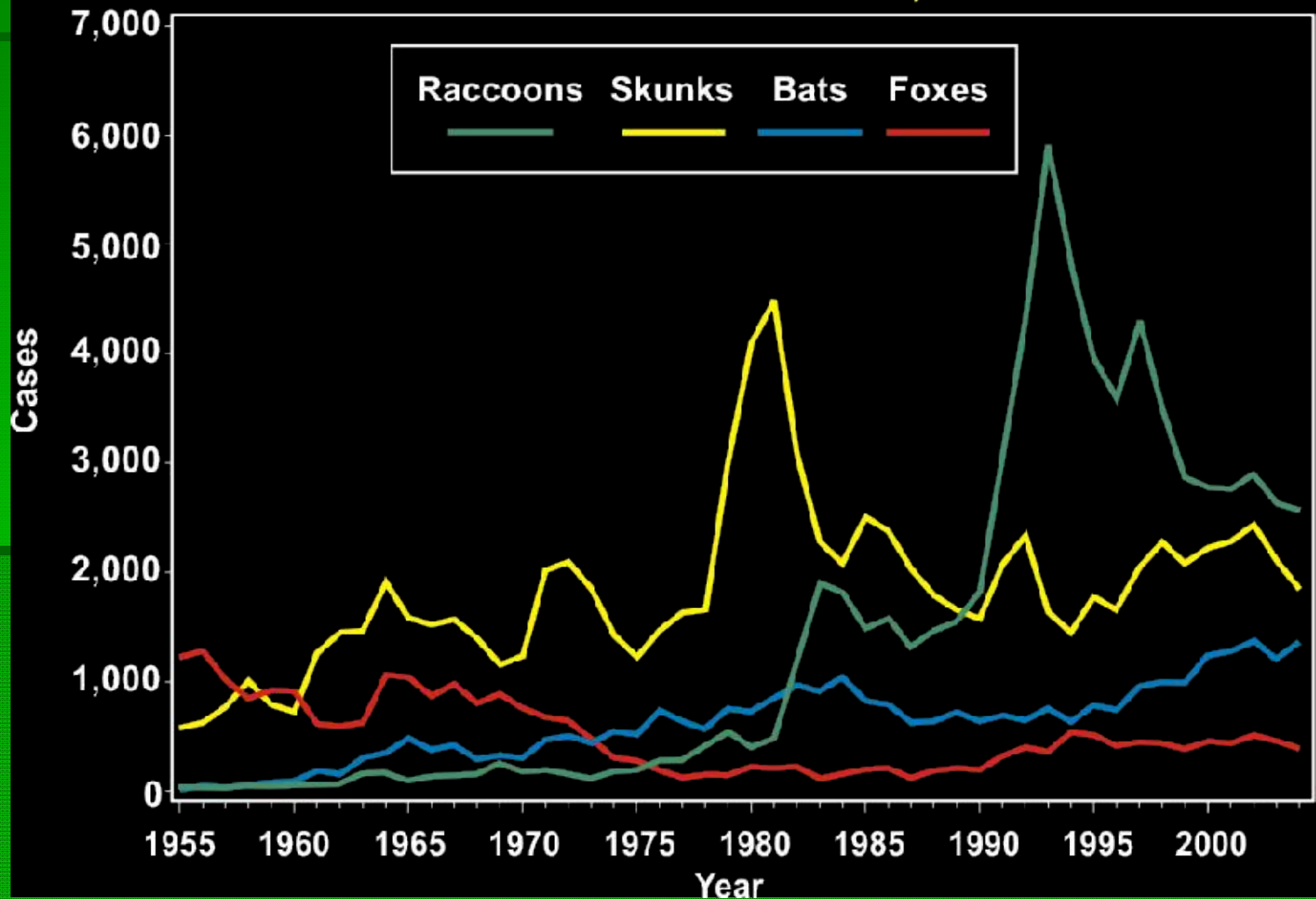
Cases of Animal Rabies, 1955-2004



Maps

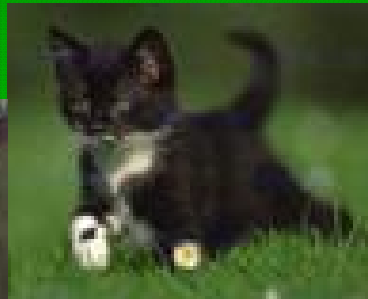
United States

Rabies in Wild Animals, 1955-2004



Any mammal can get rabies—

- Raccoons, skunks, foxes and bats
- Dogs, cats, cattle and ferrets
- Humans



Reservoir

- Mammals that are LESS likely to give you rabies—



Reservoir

- Animals that CANNOT give you rabies—



Reservoir



- In the late 70's, hunters translocated raccoons from Florida to Virginia—animals infected and no quarantine law in place at that time
- 50,000 rabid raccoons diagnosed to date in Virginia
- Before 1960, most animal cases in domestic animals, now more than 90% in wildlife due to required vaccinations

Infectious Pathway

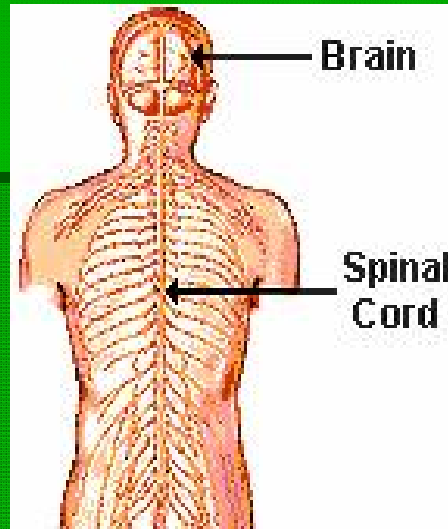
Figure 1. The infectious path of rabies virus

1. Raccoon is bitten by a rabid animal.
2. Rabies virus enters the raccoon through infected saliva.
3. Rabies virus spreads through the nerves to the spinal cord and brain.
4. The virus incubates in raccoon's body for approximately 3-12 weeks. The raccoon has no signs of illness during this time and is not contagious.
5. When it reaches the brain, the virus multiplies rapidly, passes to the salivary glands, and the raccoon begins to show signs of disease.



Infectious Pathway

- **How does rabies make you sick?**
 - Once inside the body, the virus travels along the nerves to the spinal cord and brain.



Transmission

- **Virus-laden saliva of a rabid animal introduced by a bite or scratch**
- **Airborne spread demonstrated in a cave (aerosolized dried bat saliva)**
- **Theoretically, person-to-person from infected saliva (not occurred)**
- **Contamination of mucous membranes (eyes, nose, mouth)**

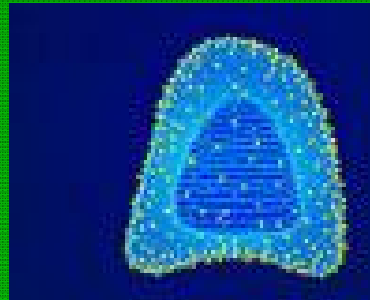
Transmission

- No person in the United States has ever contracted rabies from a dog, cat or ferret held in quarantine for 10 days.



Transmission

- Transmission to health care workers has not been documented.
- Transmission from fomites or environmental surfaces has not been documented.



Transmission



- Needle sticks considered a risk of exposure due to potential contact with nervous tissue.
- Contact with blood, feces or urine is not considered a risk.

Rabies from Transplants

- In 1999 transmission of rabies occurred among eight recipients of transplanted corneas in five countries.



Rabies from Transplants

- **In 2004, first documented cases of transmission from solid organ transplants**
- **Donor's death attributed to subarachnoid hemorrhage leading to cerebral herniation**
- **Three recipients (kidneys, liver) died within 30 days of transplant from encephalitis**
- **Bat specific variant detected post-mortem**

Rabies from Transplants



- 2004, liver transplant recipient died from rabies
- Testing of donor and liver revealed no evidence of infection with rabies virus
- Donor of segment of iliac artery used in transplant subsequently found to have rabies

Recovery from Human Rabies



- **December 2004—first documented recovery from rabies by a patient who had not received pre- or post-exposure prophylaxis**
- **A 15 y.o. female from Fond du Lac County in Wisconsin**
- **One month prior to symptom onset had been bitten by a bat**

Incubation



- Usually 3-8 weeks
- Depends on:
 - Severity of wound
 - Concentration of contamination
 - Site of wound (richness of nerve supply)
 - Distance to brain

Incubation

- A bite by the animal during the incubation period does not carry a risk of rabies because the virus is not in saliva



Law

- **Chesapeake City Code - Sec. 10-94. Reporting**
 - **It shall be the duty of any animal control officer, deputy animal control officer, police officer, private physician or hospital or any other person having knowledge of an animal having caused an exposure to report it as soon as possible, not later than 48 hours after its occurrence, to the city department of public health or the animal bureau.**

Strict Isolation

- Relates to incubation period
- Used when animal bitten by rabid or potentially rabid animal



Strict Isolation

- Prevents direct contact between the animal and any human or other animal
- Allows for feeding, watering and cleaning
- Unvaccinated dogs, cats and ferrets exposed to a rabid animal should be euthanized or placed in strict isolation for 6 months
- If the animal has been vaccinated, it should be revaccinated immediately, kept under the owner's control, and observed for 45 days

Confinement

- Relates to period of communicability
- Pertains to the biting animal



Confinement



- Animal should be housed in a building, pen or by some other suitable escape-proof method or enclosure.
- Cannot be removed from confinement unless on a leash and under the immediate control of a responsible adult.
- A healthy dog, cat or ferret that bites a person should be confined and observed daily for 10-14 days.

Rabies Prevention/Control

- In 1947, there were 6,949 laboratory-confirmed cases of rabies in dogs (in the US)
- In 2003, there were only 117
- Major impact of required vaccinations and removal of strays and unwanted animals
- Currently, more rabies cases involve cats than dogs

Rabies Prevention/Control

- **No licensed parental vaccine for use in wild animals or hybrids**
- **Wildlife rehabilitators should be considered for pre-exposure prophylaxis**
- **Oral vaccines can be used for terrestrial animals**

Oral Vaccine – Virginia



- Primarily for immunization of raccoons to create a geographic barrier
- Tested on the Eastern Shore and most recently used in Southwestern Virginia counties
- A single gene from rabies virus placed in block of fish meal and oil—can not get rabies from the block

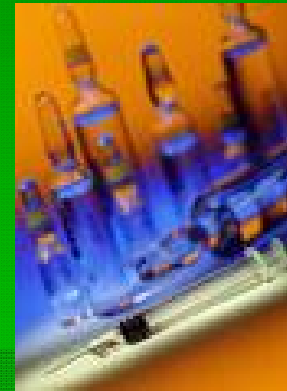
Travel Considerations



- Pre-exposure prophylaxis if:
 - Activity will bring in contact with wild animals
 - Will be in remote area where medical care may be delayed
 - Staying more than a month in area where dog rabies is common

Pre-Exposure Prophylaxis

- Annually, approximately 18,000 persons receive pre-exposure prophylaxis in the US
- Persons at risk:
 - Veterinarians
 - Animal Handlers
 - Activities bring them in frequent contact with rabid or potentially rabid animals



Pre-Exposure Prophylaxis

- **Does not eliminate need for medical attention or vaccine after potential exposure**
- **Eliminates need for HRIG after exposure**
- **Reduces number of post-exposure doses vaccine**
- **Minimizes adverse reactions**
- **Three doses, 1.0 ml IM (days 0, 7 & 21 or 28)**

When to Prophylax

Decision considers the following:

- **Type of exposure (bite vs. non-bite)**
- **Kind of animal (e.g. small rodent, domestic, wild, bat)**
- **Circumstances of the biting incident (e.g. provoked vs. unprovoked)**
- **Rabies vaccination status of the animal**
- **Availability of the animal (observation vs. testing)**
- **Prophylaxis is an urgency, but not an emergency**

Algorithms

Please refer to your handouts.

Contacts at Health Dept.:

Robert L. Smith

Environmental Health Supervisor

382-8661

Sandra Ward-Thom, Epi Nurse

382-8681

Post-Exposure Prophylaxis

(Based on Animal Exposure)

Post-Exposure Prophylaxis

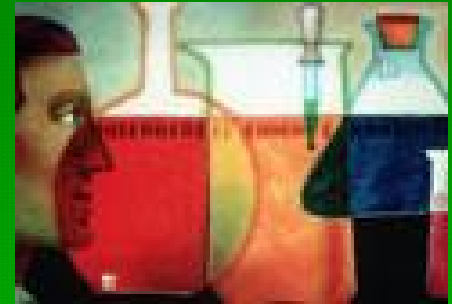
(Based on Person's Vaccination Hx)



Prophylaxis

Cost/Availability

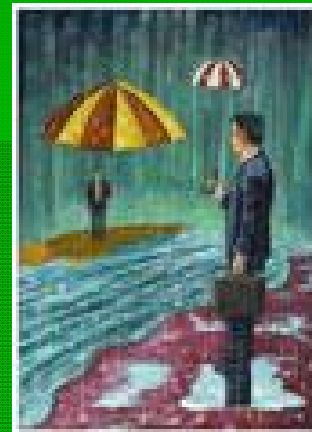
- Rabies vaccine -- \$ 71.37/1cc
- HRIG -- \$103.57/2cc vial
- Total cost around \$1,000
- Vaccine and HRIG can be ordered directly from the manufacturer and shipped to you within 24 hours
- Physicians can order at:
 - Purified Chick Embryo Cell (PCEC)
Chiron, Inc. "RabAvert" (800) 244-7668
 - HRIG only
Bayer Corp. Pharmaceutical Div. "BayRab" (800) 288-8371



Prophylaxis - Insurance

- Most 3rd party payers cover cost of medicine plus office/ER/outpatient visit
- If patient uninsured or indigent, Public Health Nurse can determine eligibility and seek assistance through the Patient Assistance Program sponsored by the drug company
- Physicians may also contact:

Patient Assistance Program
RxHope (866) 972-2437
www.RxHope.com



Important Contact Info.

- **Patient Assistance Program**
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www.RxHope.com

- **www.cdc.gov**

- **www.vdh.virginia.gov**

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The End



HANDOUT I



Algorithms—Handout 2

Human Pre- and Post-Exposure Treatment

Refer to most recent ACIP recommendations and Morbidity and Mortality Weekly Report articles on rabies prevention for details on post-exposure management and pre-exposure immunization. (The ACIP recommendations are included as a supplement to these Guidelines.) See PI 3.16 for policy regarding payment for rabies post-exposure prophylaxis.

